

2

NGC-140/000047-199

CLAIM AMENDMENTSRECEIVED
CENTRAL FAX CENTER

DEC 04 2009

1 1. (Currently amended) A method, comprising the steps of:

2 introducing a plurality of voids into a polymeric material, wherein the plurality of
3 voids fill up to twenty-five percent of a total volume of the polymeric material, and the
4 introduction of the plurality of voids into the polymeric material effects a decrease in a
5 bulk modulus of the polymeric material without substantially altering a Young's modulus
6 of the polymeric material;

7 buffering one or more sensor fibers having one or more stress sensitive
8 components in abutment with a portion of the polymeric material from one or more
9 stresses through employment of the portion of the polymeric material that comprises
10 one or more voids of the plurality of voids; and

11 accommodating a movement of the portion of the polymeric material through
12 compression of one or more of the one or more voids;

13 wherein movement of a portion of the polymeric material is accommodated
14 through compression of at least one of the voids, wherein the polymeric material with
15 the voids has a lower Poisson's ratio than the polymeric material without voids, and
16 wherein, since the voids do not substantially alter the Young's modulus of the solid
17 material, a decrease in the Poisson's ratio results in a decrease in the bulk modulus of
18 the polymeric material.

1 2. (Original) The method of claim 1, wherein the step of introducing the
2 plurality of voids into the polymeric material comprises the steps of:

3 adding the plurality of voids into a resin of the polymeric material; and

4 curing the plurality of voids and the resin to create a potting compound that
5 comprises the plurality of voids.

1 3. (Original) The method of claim 2, further comprising the steps of:
2 encapsulating one or more of the one or more stress sensitive components in the
3 potting compound; and
4 accommodating an expansion of the one or more stress sensitive components
5 through compression of the one or more of the one or more voids.

1 4. (Previously presented) The method of claim 1, wherein the plurality of
2 voids are contained within a plurality of hollow compressible microballoons, and wherein
3 the step of introducing the plurality of voids into the polymeric material comprises the
4 step of:
5 adding the plurality of hollow compressible microballoons to the polymeric
6 material.

1 5. (Previously presented) The method of claim 4, wherein the compressible
2 microballoons comprise a thin polymer wall that encapsulate a gas, and wherein the thin
3 polymer wall promotes a reservation of space in the polymeric material for the gas, the
4 method further comprising the step of:
5 accommodating the movement of the one or more stress sensitive components
6 through compression of the gas which allows a partial collapse of the thin polymer wall.

1 6. (Previously presented) The method of claim 4, wherein the step of adding
2 the plurality of hollow compressible microballoons to the polymeric material comprises
3 the steps of:

4 employing a coupling agent to promote an adhesion between the plurality of
5 hollow compressible microballoons and the polymeric material; and

6 employing the coupling agent to promote a decrease in a settling rate of the
7 plurality of hollow compressible microballoons in the polymeric material.

1 7. (Withdrawn) The method of claim 1, wherein the plurality of voids are
2 contained within a plurality of hollow compressible microfibers, wherein the step of
3 introducing the plurality of voids into the polymeric material comprises the steps of:

4 adding the plurality of hollow compressible microfibers to the polymeric material;
5 and

6 creating a plurality of void channels in the polymeric material.

1 8. (Withdrawn) The method of claim 1, wherein the plurality of voids
2 comprise a plurality of gas bubbles within the polymeric material, wherein the step of
3 introducing the plurality of voids into the polymeric material and the step of buffering the
4 one or more stress sensitive components in abutment with the portion of the polymeric
5 material from the one or more stresses through employment of the portion of the
6 polymeric material that comprises the one or more voids of the plurality of voids
7 comprise the step of:

8 spraying the polymeric material through an aerator component to introduce the
9 plurality of gas bubbles into the polymeric material and to apply the polymeric material
10 with the plurality of gas bubbles to the one or more stress sensitive components.

1 9. (Withdrawn) The method of claim 1, wherein the plurality of voids
2 comprise a plurality of gas bubbles within the polymeric material, wherein the step of
3 introducing the plurality of voids into the polymeric material comprises the steps of:
4 mixing the plurality of gas bubbles into the polymeric material; and
5 employing an air-entrainer to stabilize the plurality of gas bubbles in the
6 polymeric material.

1 10. (Withdrawn) The method of claim 1, wherein the plurality of voids
2 comprise a plurality of gas bubbles within the polymeric material, wherein the step of
3 introducing the plurality of voids into the polymeric material comprises the steps of:
4 adding a chemical blowing agent to the polymeric material;
5 increasing the temperature of the chemical blowing agent;
6 releasing the plurality of gas bubbles from the chemical blowing agent into the
7 polymeric material once the chemical blowing agent reaches a decomposition
8 temperature; and
9 trapping the plurality of gas bubbles within the polymeric material.

1 11. (Withdrawn) The method of claim 1, wherein the plurality of voids
2 comprise a plurality of gas bubbles within the polymeric material, wherein the step of
3 introducing the plurality of voids into the polymeric material comprises the steps of:
4 placing a diffuser component substantially at a bottom of a container;

5 filling a portion of the container with the polymeric material;

6 activating the diffuser component to begin to release the plurality of gas bubbles

7 into the polymeric material;

8 raising the diffuser component through the polymeric material to a position

9 substantially at a top of the container; and

10 curing the polymeric material to preserve the plurality of gas bubbles within the

11 polymeric material.

1 12. (Withdrawn) The method of claim 1, wherein the step of introducing the
2 plurality of voids into the polymeric material comprises the steps of:

3 adding a plurality of dissolvable microstructures to the polymeric material; and

4 dissolving the plurality of dissolvable microstructures through an increase in
5 temperature of the plurality of dissolvable microstructures to leave the plurality of voids
6 in the polymeric material once the plurality of dissolvable microstructures reach an
7 activation temperature.

1 13. (Withdrawn) The method of claim 1, wherein the plurality of voids
2 comprise a plurality of gas bubbles within the polymeric material, wherein the step of
3 introducing the plurality of voids into the polymeric material and the step of buffering the
4 one or more stress sensitive components in abutment with the portion of the polymeric
5 material from the one or more stresses through employment of the portion of the
6 polymeric material that comprises the one or more voids of the plurality of voids
7 comprise the steps of:

8 applying the polymeric material to the one or more stress sensitive components
9 with a brush that comprises a plurality of hollow bristles; and
10 introducing the plurality of gas bubbles from a gas supply into the polymeric
11 material through the plurality of hollow bristles.

1 14. (Previously presented) The method of claim 1, wherein the step of
2 buffering the one or more sensor fibers having the one or more stress sensitive
3 components in abutment with the portion of the polymeric material from the one or more
4 stresses through employment of the portion of the polymeric material that comprises the
5 one or more voids of the plurality of voids comprises the steps of:

6 forming a pressure-sensitive foam tape from the polymeric material with the
7 plurality of voids;

8 applying a portion of the pressure-sensitive foam tape to the one or more stress
9 sensitive components; and

10 encapsulating the portion of the pressure-sensitive foam tape and the one or
11 more stress sensitive components with a potting compound.

1 15. (Original) The method of claim 1, wherein the step of accommodating the
2 movement of the portion of the polymeric material through compression of the one or
3 more of the one or more voids comprises the step of:

4 allowing compression of one or more of the one or more voids in response to an
5 applied force to promote a decrease in a response force from the portion of the
6 polymeric material to one or more of the one or more stress sensitive components.

1 16. (Withdrawn) A method, comprising the steps of:
2 introducing a plurality of voids into a potting compound;
3 encapsulating a fiber optic sensing coil of a fiber optic gyroscope with a portion of
4 the potting compound that comprises one or more voids of the plurality of voids; and
5 promoting a decrease in a bias error of the fiber optic sensing coil though
6 accommodation of an expansion of the fiber optic sensing coil by a compression of one
7 or more of the one or more voids.

1 17. (Withdrawn) The method of claim 16, wherein the plurality of voids are
2 contained within a plurality of hollow compressible microballons, wherein the step of
3 introducing the plurality of voids into the potting compound comprises the step of:
4 adding the plurality of hollow compressible microballons to the potting compound.

1 18. (Withdrawn) The method of claim 16, wherein the step of promoting the
2 decrease in the bias error of the fiber optic sensing coil though accommodation of the
3 expansion of the fiber optic sensing coil by the compression of the one or more of the
4 one or more voids comprises the step of:
5 promoting a decrease in a strain on the fiber optic sensing coil due to a contact
6 between the fiber optic sensing coil and the potting compound by the compression of
7 the one or more of the one or more voids upon the contact.

1 19. (Withdrawn) A method, comprising the steps of:
2 introducing a plurality of voids into a polymeric material;
3 coating one or more stress sensitive components with a portion of the polymeric
4 material that comprises one or more of the plurality of voids; and
5 accommodating an expansion of the one or more stress sensitive components
6 through compression of one or more of the one or more voids.

1 20. (Withdrawn) The method of claim 19, wherein the plurality of voids are
2 contained within a plurality of hollow compressible microballons, wherein the step of
3 introducing the plurality of voids into the polymeric material comprises the step of:
4 adding the plurality of hollow compressible microballons to the polymeric
5 material.

1 21. (Previously presented) The method of claim 1, wherein the step of
2 buffering the one or more sensor fibers having the one or more stress sensitive
3 components comprises the steps of:
4 encapsulating a fiber optic sensing coil within the polymeric material that
5 comprises the plurality of voids, wherein the fiber optic sensing coil comprises a first coil
6 portion and a second coil portion, and wherein the first coil portion is adjacent to the
7 second coil portion; and
8 locating one or more of the plurality of introduced voids between the first coil
9 portion and the second coil portion.

1 22. (Previously presented) The method of claim 21, wherein the first coil
2 portion comprises a first layer of the fiber optic sensing coil, and wherein the second coil
3 portion comprises a second layer of the fiber optic sensing coil; and
4 wherein the step of locating one or more of the plurality of introduced voids
5 between the first coil portion and the second coil portion comprises the step of:
6 locating one or more of the plurality of introduced voids between the first layer
7 and the second layer.

1 23. (Previously presented) The method of claim 21, wherein the fiber optic
2 sensing coil comprises a layer of a plurality of optical fiber windings, and wherein the
3 first coil portion comprises a first optical fiber winding of the plurality of optical fiber
4 windings, and wherein the second coil portion comprises a second optical fiber winding
5 of the plurality of optical fiber windings; and
6 wherein the step of locating one or more of the plurality of introduced voids
7 between the first coil portion and the second coil portion comprises the step of:
8 locating one or more of the plurality of introduced voids between the first winding
9 and the second winding.

1 24. (Previously presented) The method of claim 2, wherein the step of adding
2 the plurality of voids into the resin of the polymeric material further comprises the step of
3 adding the plurality of voids into the resin of the polymeric material in a substantially
4 uniform distribution.

1 25. (Previously presented) The method of claim 1, wherein the plurality of
2 voids comprise a diameter that is smaller than a distance of separation between
3 adjacent portions of the one or more sensor fibers.

1 26. (Previously presented) The method of claim 25, wherein the diameter of
2 each of the plurality of voids is less than fifty micrometers.

1 27. (Previously presented) The method of claim 1, wherein the plurality of
2 voids fill ten percent of the total volume of the polymeric material.